



BLOWOUT PREVENTERS

DEFINITION & FUNCTIONS

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DEFINITION

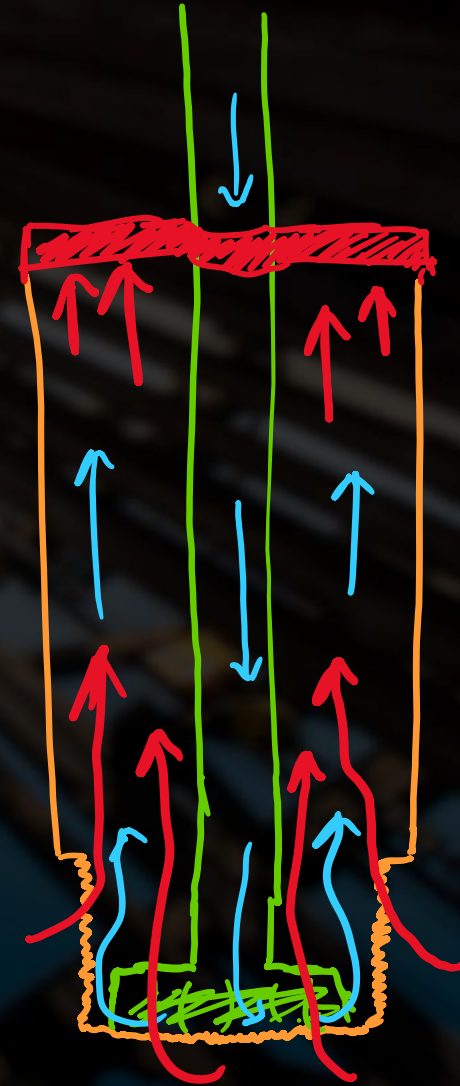
- ▶ A mechanical device used to stop or prevent a blowout at surface.
 - ▶ Comprised of a series of valves
 - ▶ Used to protect life, environment, and equipment
 - ▶ Found commonly on drilling rigs, completion equipment, workover rigs, etc.





FUNCTIONS

- ▶ Used as a secondary barrier
- ▶ Used if signs of a kick are detected
- ▶ Seal around or cut pipe
- ▶ Provides a means to isolate and control kicks – kill line, etc.
- ▶ Stop or prevent uncontrolled release of fluids from wellbore
- ▶ Prevent workstring from exiting hole





PARTS

- ▶ Comprised of multiple valves = BOP stack
- ▶ Accumulators provide hydraulic power to valves
- ▶ Hydraulic lines
- ▶ Controls
- ▶ Offshore modifications





NOTES

- ▶ Installation
- ▶ Simple operations, but must be maintained, pressure tested, and respected
- ▶ BOP's can fail
- ▶ BOP stacks will differ; redundancy
- ▶ BOP's have pressure ratings
- ▶ **Fun fact: before actuating, driller pulls until collar is above rig floor**





5 MAIN TYPES

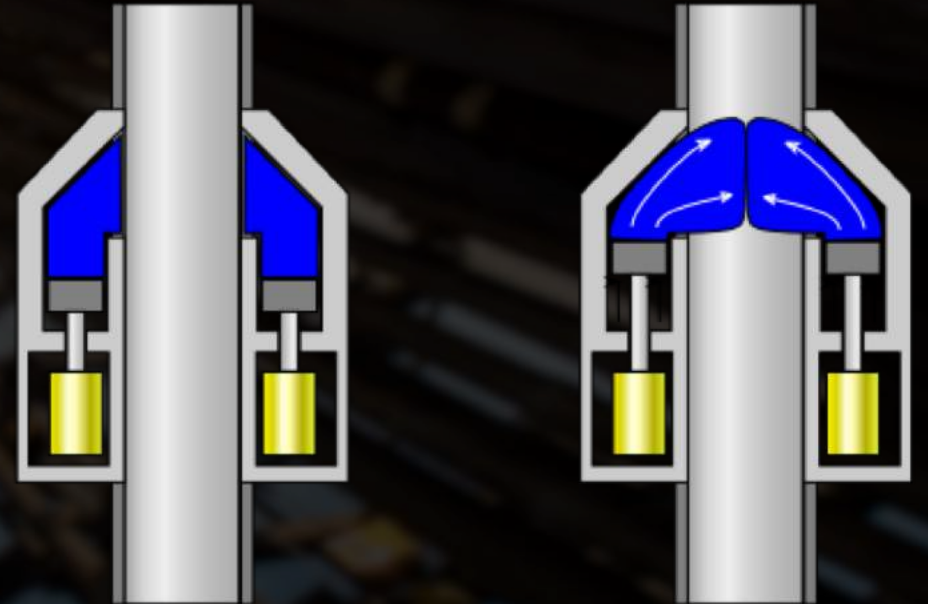
- ▶ Annular
- ▶ Rams
 - ▶ Pipe rams
 - ▶ Blind rams
 - ▶ Shear rams
 - ▶ Blind shear rams





ANNULAR BOP

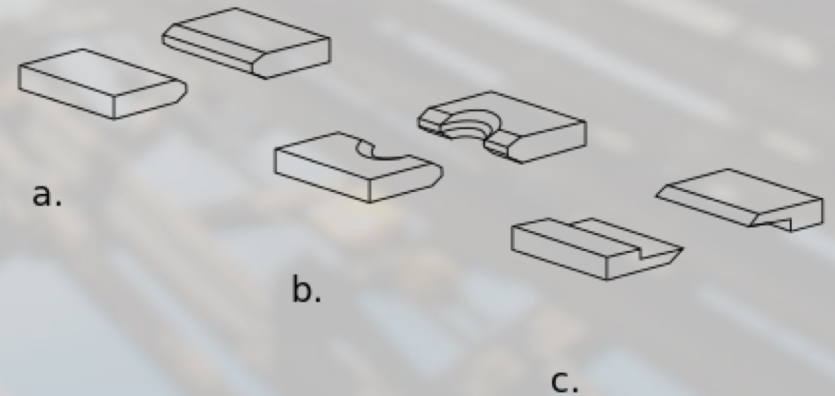
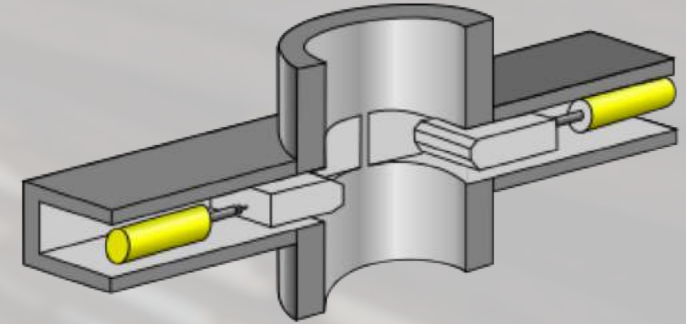
- ▶ Placed on top of the other BOPs
- ▶ Creates a doughnut-like seal around any sized pipe in hole
- ▶ Can close on open hole, but will need replaced
- ▶ Can vary pressure applied and can “snub”
- ▶ Typically rated to 5k onshore





RAMS

- ▶ Commonly rates to **10k** onshore
- ▶ Blind rams seal **empty wellbore**
- ▶ Pipe rams seal annulus around a **specific pipe size**
- ▶ Shear rams **cut** the pipe in the hole
- ▶ Blind shear rams cut the pipe **and seal the wellbore**



Main Types of Blowout Preventers (BOP's)

- ▶ A BOP stack consists of multiple different types of BOP's to be able to prevent a blowout during multiple parts of the operation. A typical stack of a land rig can be seen to the right.

Annular BOP (5,000 psi)

Pipe ram and blind ram
(10,000 psi)

Flow cross to manage
kicks

Pipe ram (10,000 psi)

